WHAT IS CLAIMED IS:

1. A fingerprint sensor, comprising:

a transparent material having a contact surface which receives a fingertip of a user;

a source of optical radiation disposed on one side of the transparent material, the source directing the radiation through the transparent material for reflection by the fingertip; and

detectors disposed on one side of the transparent material, the detectors positioned to receive radiation reflected by the fingertip and generating electrical signals in response to the detected radiation.

2. The optical module of Claim 1, further comprising a substrate having a first surface facing the source of optical radiation.

3. The optical module of Claim 2, wherein the substrate is disposed between the detectors and the source of optical radiation, the detectors facing the surface which receives the fingertip.

4. The optical module of Claim 3, wherein a gap separates the substrate from the source of optical radiation.

5. The optical module of Claim 2, wherein the source of optical radiation is disposed between the detectors and the substrate, the detectors facing the surface which receives the fingertip.

6. The optical module of Claim 1, wherein the source of optical radiation includes an electroluminescent light source.

7. The optical module of Claim 6, wherein the electroluminescent light source includes an organic electroluminescent material.

8. The optical module of Claim 7, wherein the electroluminescent material includes a light emitting polymer.

9. The optical module of Claim 6, wherein the electroluminescent light source includes an inorganic electroluminescent material.

10. The optical module of Claim 9, wherein the inorganic electroluminescent material includes phosphor.

11. The optical module of Claim 1, wherein the source of optical radiation includes an electroluminescent panel.

12. The optical module of Claim 1, wherein the transparent material comprises a planarization layer.

13. The optical module of Claim 12, wherein the planarization layer has a thickness between approximately 1 μm and approximately 2 μm.

14. The optical module of Claim 12, wherein the planarization layer includes a transparent, nonconducting polymer.

15. The optical module of Claim 12, wherein the transparent material further comprises a coating covering the planarization layer.

16. The optical module of Claim 15, wherein the coating has a thickness of approximately 1000 Å.

17. The optical module of Claim 12, wherein the coating includes indium tin oxide.

18. The optical module of Claim 12, wherein the coating includes aluminum doped zinc oxide.

19. The optical module of Claim 1, wherein the detectors are part of a detector array comprising a plurality of pixels, each pixel including one photosensitive detector.

20. The optical module of Claim 19, wherein the photosensitive detectors are photodiodes.

21. The optical module of Claim 20, wherein each pixel further includes a switching diode connected in series to the photodiode.

22. The optical module of Claim 21, wherein each pixel includes an optical barrier which optically isolates the photodiode from ambient light.

23. The optical module of Claim 22, wherein the optical barrier has walls surrounding the photodiode and extending in direction of the contact surface, and

wherein the optical barrier has an opening facing the contact surface and allowing the reflected light to be incident on the photodiode.

24. The optical module of Claim 23, wherein the optical barrier covers the switching diode.

25. The optical module of Claim 19, wherein the photosensitive detectors are photosensitive transistors.

26. The optical module of Claim 25, wherein each pixel further includes a switching transistor and a capacitor which are connected to charge the capacitor during a detect cycle and to discharge the capacitor during a read cycle

27. The optical module of Claim 26, wherein each pixel includes an optical barrier which optically isolates the photosensitive transistor from ambient light.

28. The optical module of Claim 27, wherein the optical barrier has walls surrounding the photodiode and extending in direction of the contact surface, and wherein the optical barrier has an opening facing the contact surface and allowing the reflected light to be incident on the photosensitive transistor.

29. The optical module of Claim 26, wherein the photosensitive transistor is opaque, and wherein the capacitor is transparent for light emitted by the source of optical radiation.

30. The optical module of Claim 1, wherein the source of optical radiation includes individual light sources, and wherein the detectors and the light sources are positioned within a first layer.

31. The optical module of Claim 30, wherein each pixel further includes a light barrier separating the photodetector and the light source.

32. The optical module of Claim 31, wherein at least one of the light source and the detector is positioned within a cavity having an opening facing the contact surface.

33. The optical module of Claim 31, wherein the light source is positioned within a cavity having an opening facing the contact surface, and wherein the detector is positioned outside the cavity.

34. The optical module of Claim 1, further comprising an optical lens positioned between the source of optical radiation and the detectors, the optical lens projecting reflected light onto the detectors.

35. The optical module of Claim 34, further comprising a substrate positioned between the optical lens and the source of optical radiation, the substrate comprising the source of optical radiation on a surface facing the fingertip.

36. The optical module of Claim 34, further comprising a reflector positioned between the optical lens and the source of optical radiation, the reflector diverting reflected light onto the detectors.

37. The optical module of Claim 34, wherein the source of optical radiation is an electroluminescent panel having predetermined areas which emit light and predetermined areas which are transparent so that reflected light can pass through.

38. The optical module of Claim 34, wherein the source of optical radiation is an array of individual light emitting diodes.

39. The optical module of Claim 1, wherein the source of optical radiation is positioned between the transparent material and the detectors.

40. The optical module of Claim 1, further comprising a plurality of optical fibers having distal ends and proximal ends which face the transparent material, a first group of the distal ends facing the source of optical radiation to guide light to the transparent material and a second group of the distal ends facing the detectors to guide the reflected light, which represents an image of the fingertip, to the detectors

41. The optical module of Claim 40, wherein the optical fibers at the distal end and the proximal end are arranged in a congruent manner so that the image is the same at the proximal end and the distal end.

42. An optical image sensor system, comprising:

a driver module connectable to a controller;

a power supply connectable to the controller; and

an optical module connected to the driver module, the optical module comprising a transparent material having a contact surface which receives a fingertip of a user, and a source of optical radiation disposed on one side of the transparent material and connected to the power supply, the source directing the radiation through the transparent material for reflection by the fingertip, and detectors disposed on one side of the transparent material, the detectors positioned to receive radiation reflected by the fingertip and generating electrical signals in response to the detected radiation.

43. The system of Claim 41, wherein the optical module further comprises a contact element located within the contact surface, the contact element being electrically conducting and exposed to be touched by the object.

44. The system of Claim 42, further comprising a sensor module connected to the contact element and the controller, the sensor module configured to detect if the object is placed on the optical module.

45. The system of Claim 43, wherein the sensor module is a current detector configured to sense a current flowing between the contact element and the object.

46. A method of generating an electronic representation of a relief object, comprising the steps of:

placing the relief object on a surface of an optical module;

passing light through the surface of the optical module and illuminating the relief object from within the optical module;

operating photosensitive elements of the optical module in a detect mode which detects light reflected from the relief object, the reflected light causing a photocurrent in each illuminated photosensitive element, each

photocurrent acting on a charge-storing mechanism assigned to a photosensitive element; and

operating the photosensitive elements in a read mode associated with the charge-storing mechanism to determine if a photosensitive element has been exposed to light during the detect mode.

47. The method of Claim 45, further comprising the step of activating a light source to emit light during the detect mode.

48. The method of Claim 46, further comprising the step of deactivating the light source during the read mode.

49. The method of Claim 46, further comprising the step of activating the light source prior to the detect mode.

50. The method of Claim 45, further comprising the steps of detecting if the relief object is placed on the surface, and activating a light source if the relief object is placed on the surface.

51. The method of Claim 45, further comprising the step of repeating the detect and read modes.

52. The method of Claim 50, wherein the detect and read modes are repeated three times.

53. The method of Claim 45, further comprising the steps of capturing an electronic representation of the relief object by evaluating outputs of the integrating circuit, wherein an illuminated photosensitive element generates a high signal and a not-illuminated photosensitive element generates a low signal.

54. The method of Claim 52, wherein the relief object is a fingertip having a pattern of ridges and valleys, wherein a valley reflects light illuminating a photosensitive element, and wherein a ridge covers a photosensitive element.

55. The method of Claim 53, further comprising the step of repeating the detect and read modes prior to capturing the electronic representation.

56. The method of Claim 54, further comprising the step of adjusting at least one parameter of the optical module, the at least one parameter selected from

the group consisting of brightness of the light, illumination time, detect mode interval, and read mode interval.

57. A method of detecting a fingertip, comprising the steps of:

placing a finger in contact with a surface of a material transparent to optical radiation such that the finger contacts the surface over a surface area;

passing optical radiation through the transparent material to illuminate the surface area;

reflecting optical radiation from the finger to provide reflected optical radiation; and

using the reflected optical radiation to illuminate photosensitive elements by passing the reflected optical radiation through the transparent material.

58. The method of Claim 56, further comprising the step of detecting if the fingertip is in contact with the surface.

59. The method of Claim 57, further comprising the step of activating a light source to illuminate the surface area.

60. The method of Claim 56, wherein the fingertip includes a pattern of ridges and valleys, the valleys reflecting the optical radiation to illuminate at least some of the photosensitive elements and the ridges covering at least some of the photosensitive elements avoiding illumination of a covered photosensitive element.

61. The method of Claim 56, further comprising the steps of:

operating the photosensitive elements in a detect mode which detects light reflected from the fingertip, the reflected light causing a photocurrent in each illuminated photosensitive element, each photocurrent acting on a charge-storing mechanism assigned to a photosensitive element; and

operating the photosensitive element in a read mode which acts on the charge-storing mechanism to determine if a photosensitive element has been exposed to reflected light during the detect mode.

62. A fingerprint sensor, comprising:

a transparent material having a surface which receives a fingertip of a user;

a source of optical radiation disposed on one side of the transparent material, the source directing the radiation through the transparent material for reflection by the fingertip;

detectors disposed on one side of the transparent material, the detectors positioned to receive radiation reflected by the finger, the detectors generating electrical signals in response to the detected radiation; and

a circuit which converts the electrical signals into an electronic representation of a fingerprint.

63. The fingerprint sensor of Claim 61, wherein the detectors are included in an array of pixels, each pixel including an arrangement of a photosensitive element and a switching element which act on a charge-storing mechanism.

64. The fingerprint sensor of Claim 62, wherein the pixels are configured to operate in a detect mode and a read mode.

65. The fingerprint sensor of Claim 61, wherein the source of optical radiation is selected from the group consisting of an electroluminescent light source, an organic electroluminescent light source, an inorganic electroluminescent light source, and an electroluminescent panel.

66. An optical sensor, comprising:

a transparent material having a surface which receives a fingertip of a user;

a source of optical radiation, disposed on one side of the transparent material, the source directing the radiation through the transparent material for reflection by the fingertip, the source being substantially planar and having an emitting area that is approximately the same size as the surface of the transparent material; and

a detector disposed on the one side of the transparent material, the detector positioned to receive radiation reflected by the fingertip and generating electrical signals in response to the detected radiation.

67. The optical sensor of Claim 65, further comprising a circuit which processes the detected signals.

68. The optical sensor of Claim 65, wherein the detector comprises an array of photosensitive elements and switching elements in communication with the circuit.

69. The optical sensor of Claim 65, wherein the source of optical radiation includes an electroluminescent panel.

70. The optical sensor of Claim 65, wherein the source of optical radiation includes an array emitter.

71. The optical sensor of Claim 69, wherein the array emitter includes a plurality of pixelized light sources.

72. An optical sensor, comprising:

a transparent material having a surface which receives a fingertip of a user;

a source of optical radiation, disposed on one side of the transparent material, the source directing the radiation through the transparent material for reflection by the fingertip;

a detector disposed on the one side of the transparent material, the detector positioned to receive radiation reflected by the fingertip, the detector comprising an array of photosensitive elements positioned between the source and the transparent material and generating electrical signals in response to the detected radiation; and

a circuit which processes the detected signals.

73. A sensor, comprising:

a transparent material having a surface which receives an object;

a planar array of pixels on one side of the transparent material, each pixel including a source of optical radiation and a photosensitive element, the source configured to direct the radiation through the transparent material for reflection by the object, and the detector configured to generate an electrical signal in response to incident radiation.

74. The sensor of Claim 72, further comprising a circuit which converts the electrical signal into an electronic representation of the object.

75. The sensor of Claim 73, wherein the object is a fingertip and the electronic representation corresponds to a fingerprint.

76. The sensor of Claim 72, wherein each pixel comprises an optical barrier which optically isolates the source and the photosensitive element.

77. The sensor of Claim 75, wherein the optical barrier has walls surrounding the photosensitive element and extending in direction of the surface, and wherein the optical barrier has an opening facing the surface and allowing the reflected light to be incident on the photosensitive element.

78. The sensor of Claim 76, wherein the opening has a rectangular shape.

79. A fingerprint sensor, comprising:

a transparent material having a surface which receives a fingerprint of a user;

at least one light source which illuminates said surface for reflection by the fingerprint;

a collector positioned to collect light reflected from the user's fingerprint; and

a detector which receives light collected by the collector; wherein said at least one light source is arranged so that light directed towards valleys of the fingerprint is collected by the collector, while light directed towards ridges of the fingerprint is not collected by the collector.

80. The sensor of Claim 79, wherein the collector comprises a lens.

81. The sensor of Claim 79, wherein the collector comprises a coherent fiber bundle.